Applicant: Tong Zhang
"Using Background Audio Change Detection for
Segmenting Video"
Atty. Docket No. 10018002-1 (N1424-050)
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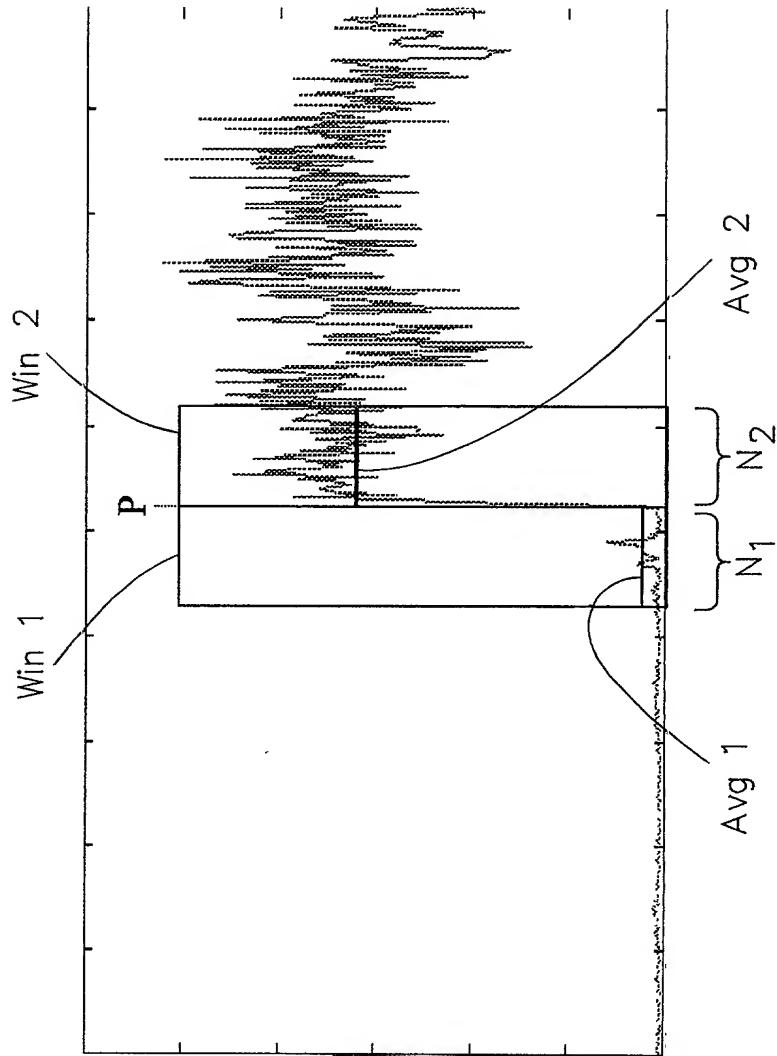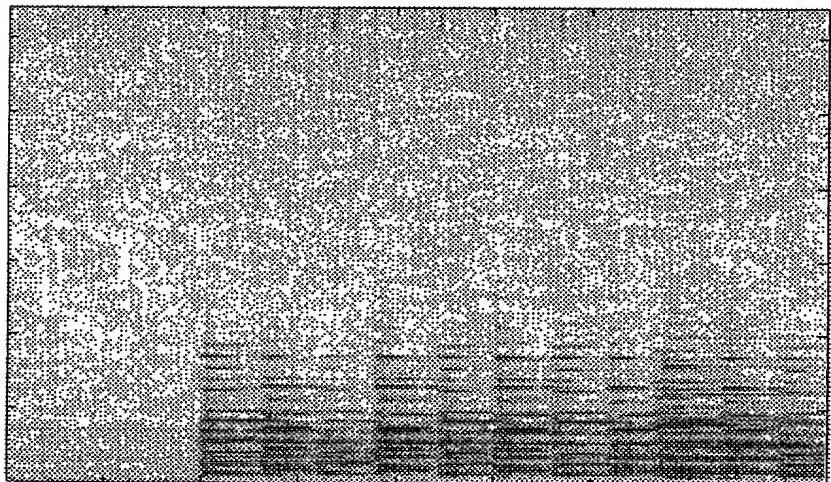Rothwell, Figg, Ernst & Manbeck

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VIDEO PROCESSING DEVICE

MEMORY	
AUDIO BLANK VOLUME	VIDEO DATA
AUDIO BLANK PERIOD	AUDIO DATA
AUDIO VOLUME CHANGE	AUDIO BLANK ENERGY
AUDIO FREQUENCY CHANGE	AUDIO BLANK ZCR
MUSIC VOLUME	BLANK PERIOD COUNT
NOISE	MAXIMUM ENERGY
	MAXIMUM ZCR

124
126
125
128
129
130

115
116
118
119
122
113
114

PROCESSOR — 104

| ENERGY DETECTOR |
| AUDIO BLANK DETECTOR |
| AUDIO VOLUME DETECTOR |
| FREQUENCY CONTENT DETECTOR |
| VIDEO SHOT DETECTOR |
| BACKGROUND AUDIO DETECTOR |
| MUSIC DETECTOR |

152
133
136
137
141
143
148

COMMUNICATION
INTERFACE
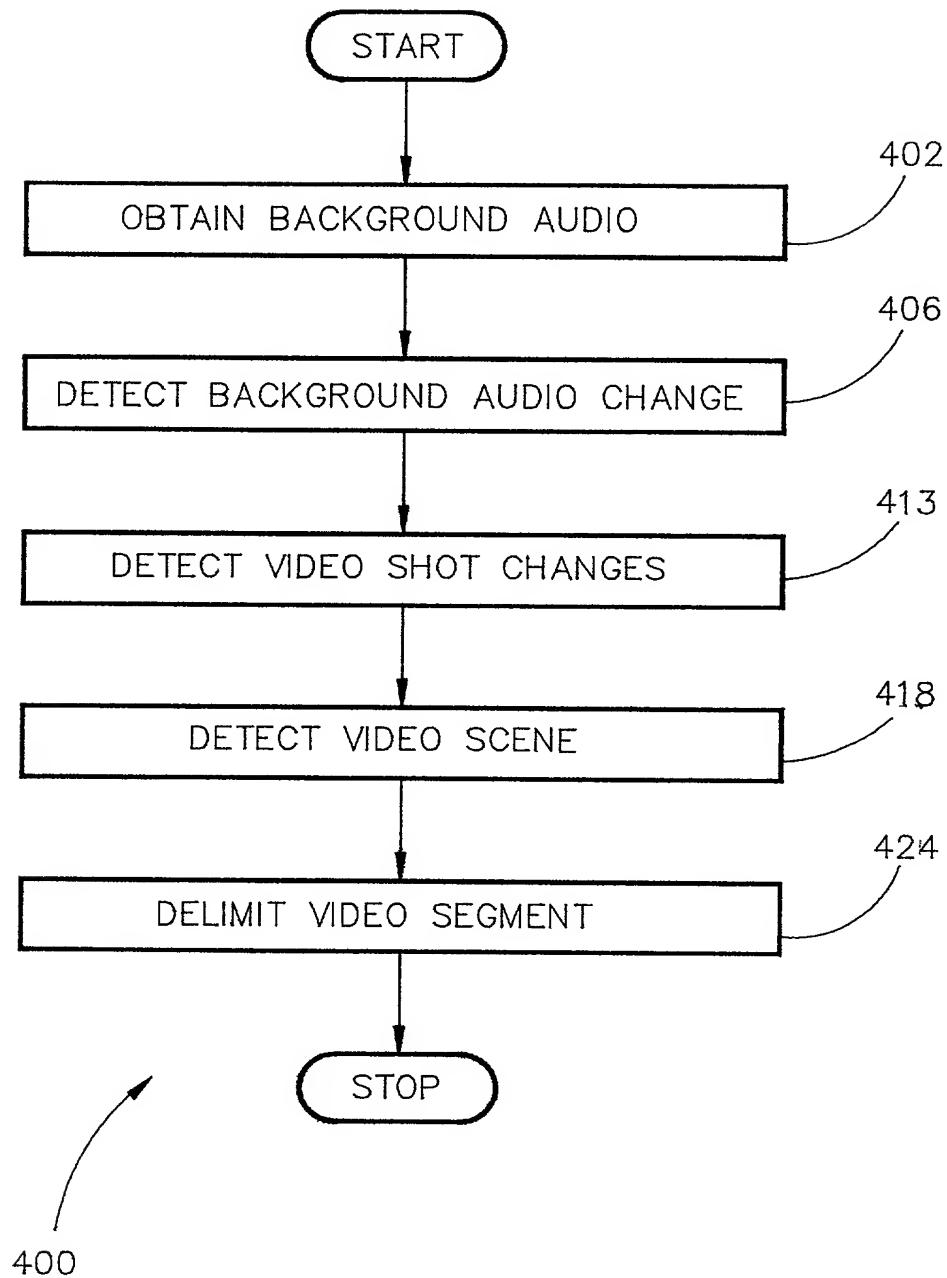
I/O
DEVICE — 108

109

100

FIG. 1

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FIG. 2

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FIG. 3

```
                    ┌─────────┐
                    │  START  │
                    └─────────┘
                         │
                         ▼
   ┌──────────────────────────────────────┐      402
   │     OBTAIN  BACKGROUND  AUDIO          │
   └──────────────────────────────────────┘
                         │
                         ▼
   ┌──────────────────────────────────────┐      406
   │   DETECT  BACKGROUND  AUDIO  CHANGE    │
   └──────────────────────────────────────┘
                         │
                         ▼
   ┌──────────────────────────────────────┐      413
   │     DETECT  VIDEO  SHOT  CHANGES       │
   └──────────────────────────────────────┘
                         │
                         ▼
   ┌──────────────────────────────────────┐      418
   │          DETECT  VIDEO  SCENE          │
   └──────────────────────────────────────┘
                         │
                         ▼
   ┌──────────────────────────────────────┐      424
   │       DELIMIT  VIDEO  SEGMENT          │
   └──────────────────────────────────────┘
                         │
                         ▼
                    ┌─────────┐
                    │  STOP   │
                    └─────────┘
```

400

FIG. 4

500

FIG. 5

600

FIG. 6

700

FIG. 7

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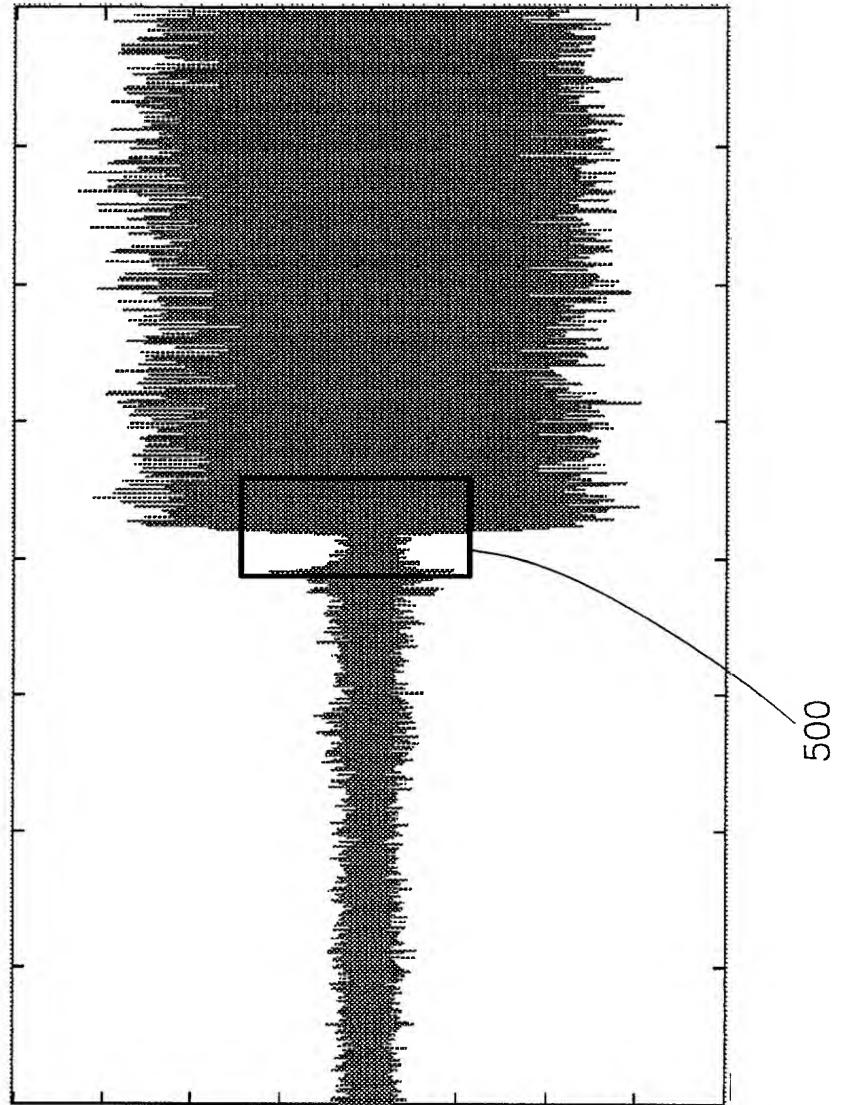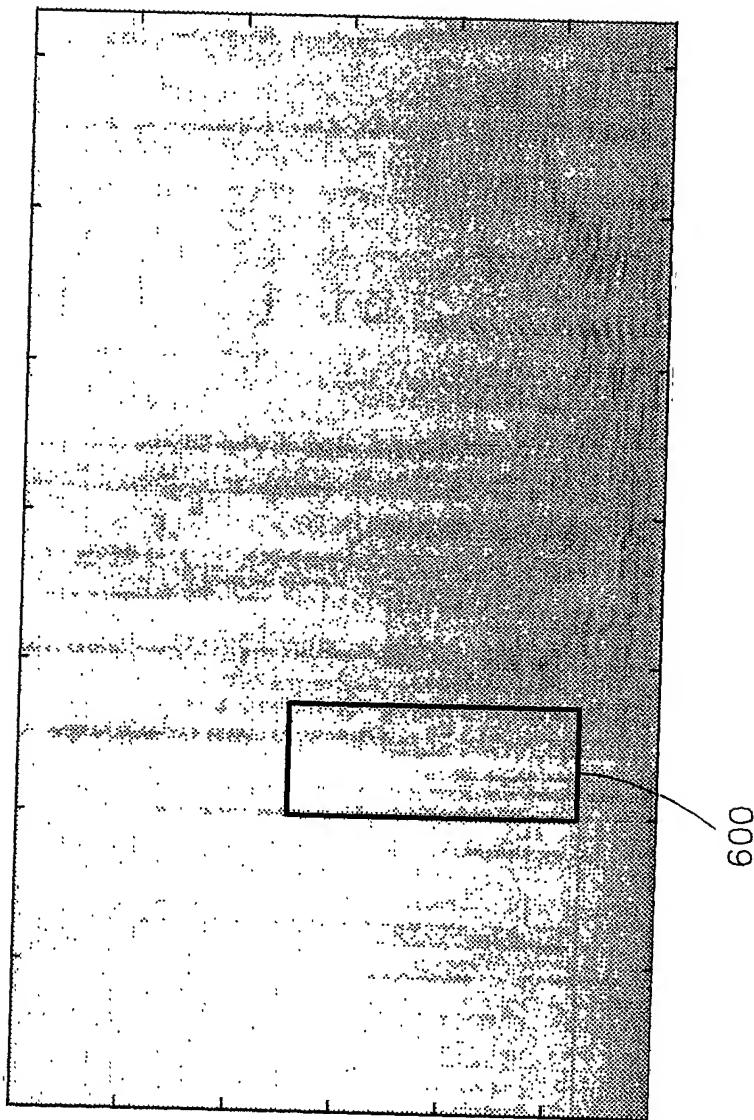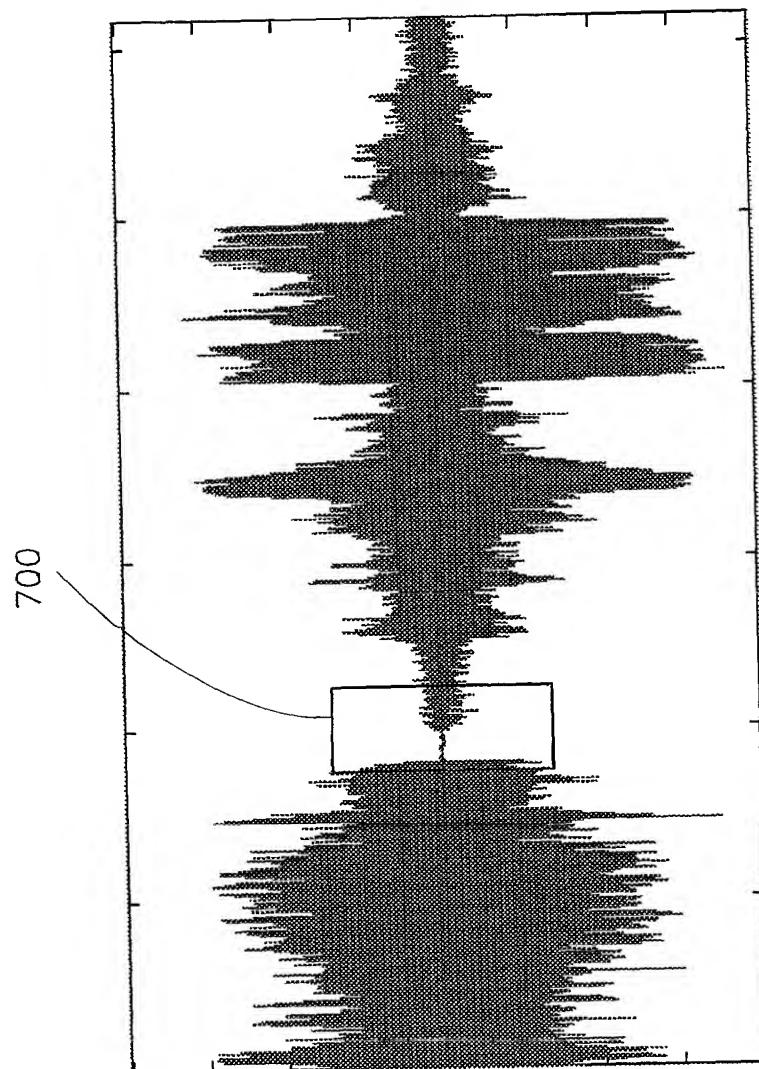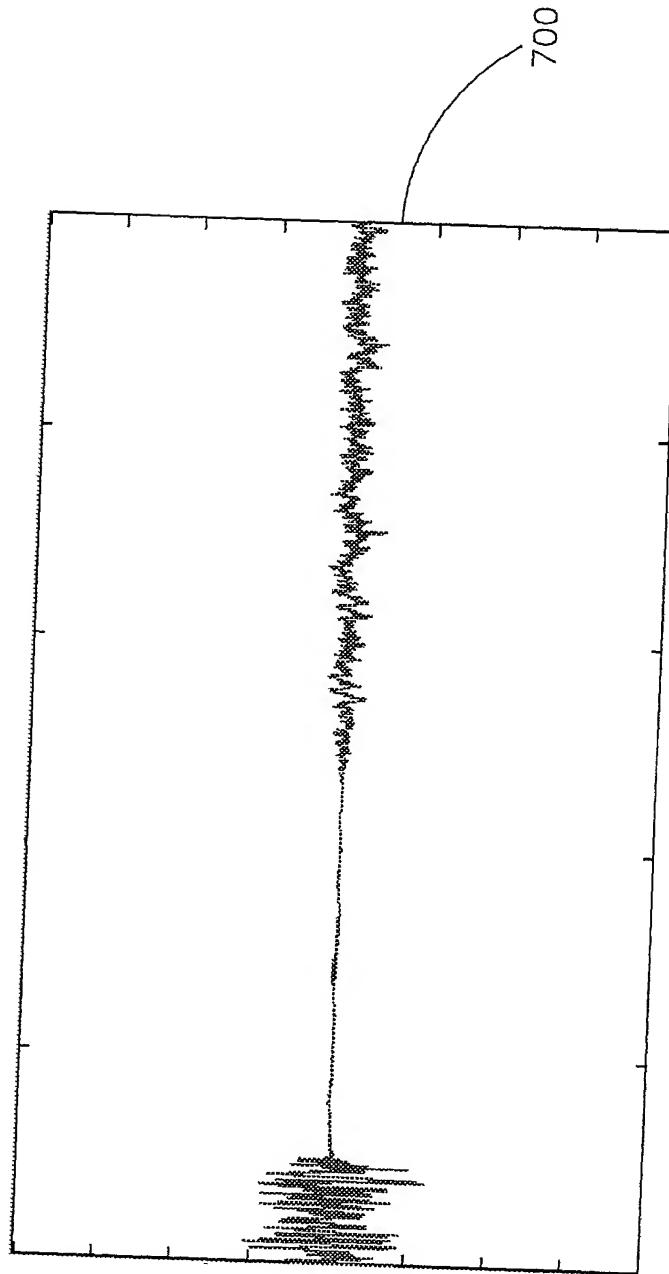Rothwell, Figg, Ernst & Manbeck

FIG. 8